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ABSTRACT

This paper explores some possible productive links between ecology and education, with particular reference to the ethical position described by the term "deep ecology" and to empirical research in perceptual psychology that has led to the formation of ecological theories of perception. It is suggested that these ecological understandings support an enduring philosophy of education that is usually traced back to Aristotle and that has flowered most recently in the essays of the late Joseph Schwab and those of his intellectual heirs who practice what has become known as deliberative curriculum theorizing. From this analysis it is argued that designing a curriculum in which the learner is characterized as becoming ecopolitical is an intellectually and morally defensible ideal. In the course of developing the analyses and arguments outlined above, some criticisms of the rhetoric of postmodern and new paradigm thinking are offered. Particular reference is made to temporal perspectives which suggest that it may sometimes be more appropriate to represent paradigms as myths and to speak of renewed rather than new paradigms. (Author/MVL)

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BECOMING ECOPOLITICAL:
SOME MYTHIC LINKS IN CURRICULUM RENEWAL

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A paper presented in a symposium, "Aspects of a Postmodern Pedagogy", at the Annual Meeting of the American Educational Research Association (Special Interest Group: Critical Issues in Curriculum), San Francisco, USA, 27-31 March 1989

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BECOMING ECOPOLITICAL: SOME MYTHIC LINKS IN CURRICULUM RENEWAL

Paper presented in a symposium, **Aspects of a Postmodern Pedagogy**, AERA (SIG: Critical Issues in Curriculum), San Francisco, 30 March 1989

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ABSTRACT

The social construction of reality, nature and human nature that has been taken for granted by a majority of people in Western industrial society for more than two centuries has been subjected to increasing criticism in recent years. Critics of this worldview suggest that a "postmodern world" is immanent and that the conceptual foundations of the "modern" world will (or ought to) be supplanted by a "new paradigm". Support for such a "new paradigm" comes from diverse disciplines and ideologies including ecology, feminism, esoteric spirituality and physical science.

This paper explores some possible productive links between ecology and education, with particular reference to the ethical position described by the term "deep ecology" and to empirical research in perceptual psychology that has led to the formation of ecological theories of perception. It is suggested that these ecological understandings support an enduring philosophy of education that is usually traced back to Aristotle and that has flowered most recently in the essays of the late Joseph Schwab and those of his intellectual heirs who practice what has become known as "deliberative" curriculum theorising. From this analysis it is argued that designing a curriculum in which the learner is characterised as "becoming ecopolitical" is an intellectually and morally defensible ideal.

In the course of developing the analyses and arguments outlined above, some criticisms of the rhetoric of "postmodern" and "new paradigm" thinking will be offered. Particular reference will be made to temporal perspectives which suggest that it may sometimes be more appropriate to represent "paradigms" as "myths" and to speak of **renewed** rather than "new" paradigms.

BECOMING ECOPOLITICAL:
SOME MYTHIC LINKS IN CURRICULUM RENEWAL

Noel Gough

Where I stand

This paper explores some interrelationships between ecopolitical thought and education and, further, argues that a desirable and defensible goal of curriculum work is to develop a pedagogy in which learning is characterised as "becoming ecopolitical".[1]

I realise that, for some audiences, the term "ecopolitical" might have connotations which could be prejudicial to my case and so I will first try to clarify where I stand on what is commonly understood by "ecopolitics". To dispel any stereotypical assumptions about my position, it must be said that I am not an "environmentalist" or a "conservationist" or any other kind of activist for specific ecopolitical causes. Much of my professional work is concerned with environmental education but I am neither an advocate nor an apologist for it (though I am as much committed to its improvement as I am to any educational enterprise). I am not an advocate of environmental education because, as it is presently conceived, it seems to ask too little of its practitioners. Most of what passes for environmental education is a limited technical response to circumstances in our environment that are not to our liking and it is justified by a familiar litany of problems: depletion of the ozone layer, the greenhouse effect, diminishing energy resources, species loss, pollution and so on. These circumstances certainly justify the kinds of environmental education that, in more ways than one, are the social equivalents of personal toilet training, but they do not in themselves provide a rationale for forms of educational practice which transcend technical interests. I prefer to work towards transformations of educational practice which will help to develop an ecopolitical culture within which environmental education (as it is presently conceived) would for the most part be unnecessary. Thus, as a curriculum scholar and teacher educator, I am more concerned with environmental education as one of a number of starting points for inquiring into educational problems that engage my practical interests (which, in my personal lexicon, subsume critical and creative interests) than with its function as an educational palliative for environmental ills (see also Gough, 1987bc).

My inquiries to date convince me that environmental education (like education for peace and other ecopolitical causes) is part of a growing awareness of certain kinds of practical problems and critical issues in education and that it is thus part of a response to educational circumstances - as well as to environmental circumstances - that fail to match our ideals. It is one of the ways in which we are trying to think seriously about these problems and about how to resolve them. Many of these problems are not obvious (in the way that, say, fouling our own nest with chlorofluorocarbon gases is

obvious) but involve questions about the worldviews, paradigms and myths that are the subliminal foundations of our experience and practice in education.

Worldviews, paradigms and myths: changes and continuities

The worldview that once provided a certain coherence to Western industrial society is one which includes, as a taken-for-granted assumption, the idea that reality, nature and human nature can and should be abstracted into

> separate entities such as atoms, individuals, academic departments, corporations, cities and nations. Causes [are] separate from effects, present from future, variable from variable, and "we" from "they" (Michael and Anderson, 1986: 114).

Critics of this worldview suggest that a "postmodern world" is coming into being in which atomistic perspectives will (and must) be replaced by more holistic emphases.

> The most striking feature of the postmodern world is its systemic character, its astounding proliferation of linkages among once-separate cultures, governments, economies and ecosystems. . .
>
> In the postmodern world, everything is connected to everything so that cause and effect, present and future, we and they are utterly ensnarled; even separating them for analytic purposes becomes far less convincing than it was in the heady recent times when academics talked with great confidence of factors and variables (Michael and Anderson, 1986: 115).

Increasing awareness of the extent to which "everything is connected to everything" has encouraged the development of a global ecopolitical movement - often referred to as "Green politics" - and its significance is such that it is regarded by many scholars as comprising a "new paradigm" in the social construction of reality, nature and human nature (e.g., Ash, 1980; Capra, 1983; Spretnak and Capra, 1984; Hutton, 1987). Green politics emphasises whole-system perspectives, ecological consciousness, feminism, trans-materialist spirituality, cultural pluralism, non-violent change, decentralisation of decision-making, human-scale technology and solidarity with developing countries (Harman, 1985: 319-21).

Some of the curriculum implications of such thinking are reasonably obvious if it is agreed that education should be shaped by conceptions of what we take to be **real** in a philosophical sense (i.e., on that which is presumed to exist independently of human imagination). Thus, if we agree that the postmodern world is **really** systemic (that "everything **is** connected to everything"), then we are likely to agree that systems of education should reflect and impart an holistic understanding of this reality.

But there is more to changing worldviews than changing conceptions of reality. Social institutions like education also arise from humans imagining that which is non-real, supernatural and transcendental. Worldviews can be thought of as **myths** - stories that embed individual experiences in a larger framework of shared values, meanings and purposes and that persist in a

culture over relatively long periods of time. Conceptions of "reality" can more readily be subsumed within myths than vice versa, especially if one accepts the non-realistic image of the universe suggested by quantum mechanics (in which consciousness is a necessary - and perhaps sufficient - condition for the existence of the universe; see McCusker and McCusker, 1988:78).

The mythic sense of worldviews also emphasises their endurance through time. Some of the rhetoric of postmodernism emphasises the concept of **change** (of dramatic breaks with past circumstances and conditions) to such an extent that ideas about **continuity** may be overlooked. But the mere demonstration of deficiencies in the now dominant worldview should not impel us to embark - as some of my colleagues would have it - on "the quest for a new...paradigm" (Dufty and Dufty, 1988). Before considering such a quest, it might be prudent to explore the possibility that the transition to a postmodern worldview involves not a "new" paradigm but, rather, the **renewal** of existing (albeit suppressed) myths.[2]

For example, the realisation that "everything is connected to everything" is not unique to the postmodern world. Perceptions of universal wholeness and the identification of human existence with all existence (in contradistinction to perceptions of a universe of separate entities and the separation of human existence from all else) are common in premodern and non-Western cultures and have survived Western modernity through various forms of subversive storytelling. However, an atomistic worldview is in large part an invention of "Civilised Man" - of the predominantly Christian patriarchy which so willingly embraced positivist science and industrialism. Thus, much of the storytelling which subverts this worldview has been undertaken by those who have been outside the cultural mainstream, such as women and children, and the evidence for its survival lies not in academically "respectable" literature but, for example, in stories told by and for children. This point is elaborated by Ursula Le Guin in her discussion of talking-animal stories in mythology and in children's literature.

> In the dreadful self-isolation of the Church,...for St. Francis to cry out "Sister sparrow, brother wolf!" was a great thing. But for the Buddha to be a jackal or a monkey was no big deal. And for the people Civilization calls "primitive", "savage", or "undeveloped", including young children, the continuity, interdependence, and community of all life, all forms of being on earth, is a lived fact, made conscious in narrative (myth, ritual, fiction). This continuity of existence,...is fundamental to whatever morality may be built upon it. Only Civilisation builds its morality by denying its foundation.
>
> By climbing up into his head and shutting out every voice but his own, "Civilized Man" has gone deaf. He can't hear the wolf calling him brother - not Master, but brother. He can't hear the earth calling him child - not Father, but son. He hears only his own words making up the world. He can't hear the animals, they have nothing to say. Children babble, and have to be taught how to climb into their heads and shut the doors of perception.... This is the myth of Civilization, embodied in the monotheisms which assign soul to Man alone.
>
> And so it is this myth which all talking-animal stories mock, or simply subvert. So long as "man" "rules", animals will make rude remarks about him (Le Guin, 1987: 11-12).

Le Guin practices what she preaches. For example, she mocks and

subverts the biblical assertion that "Man gave names to all the animals" in one of her own talking-animal stories, aptly titled "She Unnames Them" (Le Guin, 1987: 194-6). The story is a fabulation but it can be read as a demonstration of complementary insights that can be drawn from deep ecology and semiotics. "Deep ecology" is a term coined by certain ecophilosophers to describe the cultivation of a "state of being... that sustains the widest (and deepest) possible **identification**" of oneself with one's environments (Fox, 1986: 87). It is a morality built on the continuity of existence. Deep ecology can be contrasted with the "shallow environmentalism" of positivist empirical science which maintains clear distinctions and discontinuities between subject and object and, thus, between humans and other beings, plant and animal, living and non-living, and so on (see Figure 1, appended). In semiotic terms, these distinctions are sustained by the act of **naming**, which divides the world into that which is named and everything else. Naming is not simply a matter of labelling distinctions that are already thought to exist. Assigning a name to something constructs the illusion that what has been named is genuinely distinguishable from all else. In creating such distinctions, humans may have lost sight of the seamlessness of that which is signified by their words and abstractions.

Of course, it would be naïve to suggest that "unnaming" is a realistic strategy for building a postmodern culture in which "the continuity, interdependence, and community of all life, all forms of being on earth, is a lived fact". But the foundations of such a culture are already with us, not only in stories we have been telling ourselves for millenia but also in recent exemplary products of the culture they should help to transform.

Ecological theories of perception[3]

Some of the most entrenched educational practices in Western industrial society can be traced to the empiricist theories of perception and knowledge advanced by several eighteenth century philosophers, notably Locke, Berkeley and Hume. But their theories depend on the world being as Newton depicted it and the transfer of information from an object to a viewer obeying Euclid's geometry. According to this view, light reflected from an object to the retina yields only a "chaotic two-dimensional representation of reality. . . any useful knowledge of a three-dimensional world (such as stops one falling off cliffs) would have to come from some sort of intellectual inference" (Emery, 1981: 2). Locke, Berkeley and Hume "proved" that in a Newtonian world, based on Euclidean space, individuals could have no sure knowledge of a world outside them - that stimuli could yield no direct and immediate information about a three-dimensional world of solid, persistent objects and causal relations. Herbart spelt out what this implied for educational practice and behavioural psychologists like Pavlov, Thorndike, Hull and Skinner made the refinements which allowed Lockean theories "to be preserved in the face of Darwinian challenges as to how such incompetent perceptual systems could have had survival value" (Emery, 1981: 3). Thus, educational practice since the onrush of positivist science has not valued an individual's perceptions as a source of knowledge. The meaning of perceptions is held to emerge from intellectual

processes of analytic abstraction and logical inference (hence the now taken-for-granted distinction between **perception** and **cognition**) and the prime task of education is to distribute the socially-validated knowledge that has been so gained. Learning has thus come to be seen as a process of guided induction into bodies of organised propositional knowledge, in the workings of formal logic and in the skills of textual expression and comprehension (through which organised propositional knowledge is accumulated and accessed).

Clearly, educational theories that derive from eighteenth century conceptions of the physical universe should be treated with caution. Newton's physics and Euclid's geometry have long been displaced by quantum mechanics and its attendant probabilistic mathematics. What if human perceptual organs are geared to the kind of time-space continuum envisaged by Einstein rather than to Euclidean space? It seems reasonable to assume that our perceptual systems have evolved so as to be adapted to the universe **as it is** rather than to an approximate (and possibly distorted) social construction of it, yet learning in formal settings is geared to the materialistic, deterministic, atomistic, reductionist and objective vision of the universe that has been rendered insupportable by modern physics. Indeed, we are taught to distrust our own senses and feelings rather than to exercise the perceptual skills bequeathed to us by natural selection. For example, Piaget and Inhelder (1956) observed that the pre-school child's concept of space is topological but that by the age of twelve it is Euclidean. As Le Guin says, "Children ... have to be taught how to climb into their heads and shut the doors of perception".

The work of Fritz Heider (1959)[4], J.J. Gibson (1979) and others directly challenges the long-held assumption that the **meaning** of perceptions (such as the perception of order) can only arise from intellectual cogitation. Their research demonstrates the plausibility of an **ecological approach to perception** which holds that the environment has an informational structure at the level of objects and their causal interactions and that human perceptual systems have evolved to detect such information. Other researchers have drawn similar conclusions:

> . . . there is ample evidence that the senses are not only genetically preattuned but become more sensitively calibrated to pick up those exigencies of the environment that bear directly on the survival, success and well-being of the perceiver - what has sometimes been called the "education of attention" (Shaw and Pittenger, 1977: 107).

Eighteenth-century epistemology has led us to believe that "real knowledge is locked up in the storehouses of knowledge that are so jealously guarded by a priesthood of scholars and scientists" (Emery, 1981: 7) and that the best way to gain access to that knowledge is through years of schooling in the disciplines that are our means of organising the contents of these "storehouses". Ecological theories of perception suggest that unlimited information is present in our personal, social and physical environments and that with an "education of attention" we can access as much of it as we need: "It is an education in **searching** with our own perceptual systems not an education in how to someday **research** in the accumulated pile of so-called social knowledge" (Emery, 1981: 7).

Ecological theories of perception liberate teachers from being, as it were, mere tour-guides in "the accumulated piles of so-called social knowledge". The "education of attention" requires a shift in the focus of pedagogy from teacher-learner relationships to the interrelations between learners and environments. Learners' own perceptions of their environments are often disregarded by teachers who see such perceptions as distractions from the transmission of socially-validated knowledge - a process within which the teacher's authority is central. Ecological theories of perception suggest that a pedagogy which is centred on the teacher-learner relationship inhibits learning because learners will be distracted, by teachers, from attending to what is before them in their environments.

Ecological theories of perception provide some compelling reasons for rethinking educational practices, but the political reality is that, while existing systems of mass education may have been founded on spurious theories of perception and knowledge, they are supported now by entrenched social interests and powerful elites. Furthermore, those of us who have already been inducted into the "priesthood of scholars and scientists" are unlikely to turn our backs on the storehouses of theoretic knowledge with which we are so familiar and it would lack conviction if we encouraged learners to do so. But ecological theories of perception put these storehouses into a perspective which enables us to see them as a **part** (but by no means the whole) of the personal, social and physical environments that the "education of attention" allows us to **search.**

Ecopolitics and practical (deliberative) curriculum theorising

As part of his examination of the global significance of Green politics, Harman cites survey data which confirms that there has been a recent strengthening of "inner-directed" values (ecological, humane, spiritual) in Western industrialised countries, together with a deeper and more subtle shift in beliefs "away from the confident scientific materialism of the earlier part of this century" (Harman,1985: 325). He also notes that a parallel shift in developing countries is, again, away from Western materialism and towards a reassertion of native cultural values and beliefs. "The change in both cases is fundamentally a shift in our attitude toward our inner, subjective experience, affirming its importance and its validity" (1985: 325).

This attitude change may be a departure from the norms of the recent past but the strengthened beliefs are no novelty in the longer term history of Western culture and education. For example, in the Aristotelean scholastic curriculum which predominated in Europe until the eighteenth century, no strong distinction was made between matters of fact and matters of value (Reid, 1981). The ideal of scientific detachment, or of any attempt to eliminate human values from supposedly "objective" worldviews, was foreign to this scholarly tradition, regardless of whether one was studying nature, human nature or the supernatural. Thus, the recent strengthening of beliefs in the value of inner, subjective experiences may not so much be evidence of a "new" paradigm but, rather, can be seen as the re-emergence of a deeper continuity

in our culture.

Prior to the scientific and industrial revolutions, the disciplines of the medieval scholastic curriculum were conceived as practical arts rather than as theoretic "sciences". The purposes of studying literature, religion, natural history or social history were similar in essence: to help resolve the practical problems faced by humans when their desires fail to match their circumstances. These disciplines focused on the interrelationships between human moral purposes and the personal, social and physical environments in which they were seen to be situated. Thus the goal of scholarship in these disciplines was **practical**, i.e., "to perform good works", rather than **theoretic**, i.e., to discover or demonstrate some final good or universal truth (McKeon, 1977: 208). This goal changed under the influence of "scientific method" and many of the humane disciplines were reconceived as social "sciences". These sorts of distinctions can be traced back to Aristotle's conceptions of **episteme** (theoretic knowledge or "knowing that..."), **phronesis** (practical judgement or "knowing I/we should...") and **techne** (technical knowledge or "know-how"). But, while these concepts can readily be distinguished from one another for scholarly purposes, it does not necessarily follow that scholarship itself should be organised around the principle of their separability. It may be significant that Western culture has expanded specialist studies of "objective truth" and "know-how" to such a degree that terms like "epistemology" and "technology" have become generic while "praxiology" has not; practical judgement is often assumed to be no more than an "application" of science or technology. The increasing popularity of the term "praxis" (which connotes practical **action** rather than a **logos** - a subject of study) improves this situation to some degree, in spite of its appropriation by neo-Marxist scholars (see Gough, 1988b).

Aristotle used the same words to describe both what we would now call "practical" and what we would now call "political" (see Lobkowicz, 1967). The common ancestry of these terms points to some complementarities between contemporary ecopolitics and the relatively recent revival of interest in a neo-Aristotelean conception of "practical" curriculum study, initially explicated in Joseph Schwab's seminal series of papers on "The Practical" (1969, 1971, 1973), and refined further by such scholars as William Reid (1981) and Maurice Holt (1987) under the name of "deliberative" curriculum study. These scholars assert that curriculum problems are in essence practical rather than theoretic and I would add that such problems can equally well be characterised as **ecopolitical** in the broadest sense. That is, curriculum problems can only be resolved in the light of complex human/environment interrelationships which must be treated holistically rather than analytically and which necessarily involve subjectivity rather than just the "objective" methods of the sciences and technologies.

Thus, I think that there is a clear confluence among concerns for education to become more **practical** and for our culture to become more **ecopolitical**. This confluence puts conceptions of a paradigm shift into a longer term historical perspective.[5] If an emerging ecopolitical worldview can legitimately be conceived (at least to some extent) as a renewal of a

cultural tradition which spans more than two thousand years, then the domination of modern education by epistemology and technology - for a mere two centuries - may best be seen as a relatively recent aberration.

There is at least one difficulty with such a view. Some of the most valuable contributions to contemporary ecopolitics have been made by feminist scholars, yet they may be among the least likely to agree that the conceptions of curriculum and of pedagogy suggested by ecopolitics have (or should be seen to have) some of their historical roots in ancient Greece. For example, Pagano observes that

> Aristotle's notion of virtue belongs to the noble **man**. Virtue is the realization of the **telos** of **man** - not women, not children, not slaves, all of whom are imperfect... "Man" can never include others. Nor can a liberal education dedicated to persistent questions of **mankind** tell a story which will empower others.... As I interpret narratives of education, I read texts in which only man is present, in which it is against his needs and desires that all is to be judged. That was Aristotle's project,... It is the foundation of liberal education... (Pagano, 1988: 288)

Pagano is absolutely right: the story of liberal education **as it is presently conceived** is a story of exclusion. With two thousand years of hindsight Aristotle's concepts of "man" and of the **polis** seem much too narrow, but his sense of their interrelationships retains its wisdom: "man" is still a political animal who becomes what he is capable of becoming in the context of the **polis.** We now know that we must expand "man" to **human** and we must also expand the **polis** to the **ecopolis** - to the larger context of the evolving biosphere. Thus, Aristotelean assumptions can be transcended and, similarly, a liberal education must be **reconceived** in the light of contemporary contributions to **episteme** (such as ecological theories of perception) and contemporary forms of **praxis** (which is what I understand feminism to be).

A pedagogy based on ecological theories of perception (which are a product of modern psychology) and deliberative curriculum theorising (which has its roots in Aristotle's moral universe) would, in effect, be an education in "becoming ecopolitical". Indeed, it would be an education in becoming **deeply** ecopolitical. However, while the moral principles of "becoming ecopolitical" are virtually identical with those of "deep ecology", I prefer to use the term "ecopolitical" to emphasise that identifying oneself with one's environments - with **ecopolis** - is a matter of practical (i.e., political) choice, decision and action rather than the contemplation of a **logos**. I also prefer to think of "**becoming** ecopolitical", rather than of attaining the "state of **being**" sought by deep ecologists, to emphasise that human identification with the continuity, interdependence, and community of all life is dynamic and transactional and not a static or stable "state".

Towards an ecopolitical pedagogy

There are several examples of well-developed educational practices which are consistent with an ecopolitical worldview. For example, Edward de Bono's approaches to the teaching of "generative thinking" are, in effect, strategies

for getting learners to attend to the informational structure of their environments. From his work with young children and adults de Bono concludes that generative thinking about our environment and our place in it is a matter of perception, of seeing things in context, rather than a matter of puzzling over abstractions in our minds. "The teaching of thinking is not the teaching of logic but the teaching of perception" (de Bono, 1979: 77).

My own inquiries have been concerned with the programs and practices of the Institute for Earth Education, an international organisation of volunteers committed to the moral principles of "deep ecology" and to forms of environmental education founded on such principles. Earth Education originated in camp nature programs in the USA and, according to one of its founders, was "created partially out of frustration with the usual identifying-collecting-dissecting-testing approaches to nature" and to help learners "build a sense of relationship - through both feeling and understandings - with the natural world" (Van Matre, 1979: 5). Earth Education emphasises direct sensory experience and the sharpening of learners' perceptions of their environments: "Our aim is to help young people interact more directly with the fascinating array of living things around them" (Van Matre, 1979: 6-7).

Earth Education has many similarities with the "education of attention" that follows from ecological theories of perception and an emphasis on the learner-environment relationship is a consistent focus of its teaching programs. This is most evident in their similarities with de Bono's techniques for the teaching of thinking. It is particularly significant that both approaches are characterised by the imaginative use of **tools**.

De Bono supplies learners with tools which deliberately block or hinder perceptual habits, such as taking cursory samples of sensory data, making snap judgments about these data and retreating rapidly into mental abstraction, classification and generalisation. De Bono's tools are designed to prevent learners from slipping too easily into perceptual error - they are reminders to look again. These tools encourage learners to attend to their own habits of perception and help them to sustain the perceptual work by which they can gain information directly from their environments - information that cannot be gained from analytical abstraction and logical inference (Emery, 1981: 7). Thus, de Bono's tools can be thought of as instruments of **metaperception**.[6]

The tools used to sharpen sensory awareness of natural environments in Earth Education programs range from such simple devices as blindfolds and mirrors to more elaborate props and gimmicks, including the mental "tools" of role play and fantasy. An example of an Earth Education activity is described below.[7]

> A group of children (aged about 8-9 years) is huddled underneath a clump of shrubs in a forest. Marion, an Institute for Earth Education leader, has just told them that they are at the entrance to a wonderful but unfamiliar world. In a mysterious, hushed tone she says: "You will probably see intricate patterns and weird shapes; you might see strange creatures living in dark and mysterious places; there may be sights never seen

before by human eyes. I think you'll be amazed by what you'll find on your visit to the Underworld."

The children are intrigued: "The Underworld? What's the Underworld? Where is it?"

"Well," says Marion, "the Underworld is always here, always around us, but it is difficult to enter it as human beings without a little help. So we're going to use two kinds of help. First, we need a special instrument. Have any of you seen how people in submarines use a periscope to view things that are above them?" Most of the children nod their heads and Marion produces a dental mirror saying, "Well, this is a subscope and it helps us to experience the world underneath the world we usually see. It will give you a vantage point that you've never had before - to see things under things, things in holes, things in dark places."

Marion demonstrates the subscope, holding it under the gills of a mushroom. The children crowd around, peering up into its interior. They are fascinated. Marion continues:

"Now for the second item. You remember I said that the Underworld was difficult for human beings to enter. So we're going to use a little bit of magic and go disguised as crickets. We get down on our hands and knees and try to look and sound like a cricket." She holds out some metal clickers and says: "For the magic to work properly, once you have the cricket's voice you may no longer use your human voice. So go into the Underworld on your hands and knees and, if you find something that is strange or marvellous, sound your cricket voice to attract others. When you hear my cricket voice sounding without stopping, that will be the signal that the magic is wearing off and that it is time to meet back here."

Marion hands out the cricket clickers and, after an initial trial of their new voices, the "crickets" crawl into the Underworld. Busy clicking records the sharing that is taking place as the Underworld is explored. The undersides of low-lying leaves and bracket fungi, the inside of a dark hollow log and other places are all subject to investigation by subscope.

After about 6-8 minutes they hear the ceaseless sound of Marion's cricket voice and they rejoin her under the shrubs. "Well," says Marion as she collects the subscopes and clickers, "what was it like down there in the Underworld?"

In excited human voices, the explorers share their discoveries of a world to which they have previously paid little attention.

In each instance of their use, the tools used in Earth Education programs function so as to sustain perceptual work as distinct from allowing the learner to retreat into abstraction. (In other words, harking back to Le Guin, the tools teach learners how **not** "to climb into their heads and shut the doors of perception".) However, the heightening of learners' perceptual discriminations of natural environments is not the sole project of Earth Education; it also sets out to improve learners' understandings of a conceptual "environment", specifically the small number of big ideas which presently encapsulate our theoretic knowledge of ecology (viz., energy flow, cycles, interrelationships and change). These key concepts are not taught by processes (nor represented as products) of analytic abstraction and logical inference. Rather, they are used as further tools for perceiving and searching natural environments.

A key aspect of an ecopolitical pedagogy is illustrated in Earth Education's reversal of two conventions of an education based on the assumptions of eighteenth-century epistemology. Van Matre asserts that conventional schooling "differentiates conceptual learning and generalizes sensory

awareness"; learners do not study their world as a whole but, rather, study progressively smaller bits of it in the form of generalisations, propositions, definitions and facts. In Earth Education, this approach is reversed: "We differentiate in our sensory awareness and generalize in our conceptual understanding. We strive to strengthen individual senses, but opt for the big picture in understanding life" (Van Matre, 1979: 8).

Earth Education programs show that it is possible to create conditions for learning which encourage the simultaneous development of an holistic conceptual understanding and a highly differentiated sensory awareness of the learner's environments. It has also been my experience that, in the social conditions for learning they create, Earth Education programs illustrate many of the virtues (and some of the vices) of the contemporary ecopolitical movement. The main task of teaching in Earth Education is to contrive or to provide the materials, tools and settings which enable learners to search their environments with their own perceptual systems. The result is that teachers and learners tend to "share and do" rather than to "show and tell". However, it is also patently obvious that these democratic conditions are usually achieved through very artful contrivance and a willingness to manipulate learners towards behaviours which are consistent with Earth Educators' moral purposes. The assertiveness with which Earth Educators display their sense of moral superiority can be irksome even to those of us who believe that their moral convictions are defensible.

This reservation notwithstanding, the approach to developing both conceptual understanding and perceptual discrimination that is exemplified by Earth Education provides a useful model for building practical bridges between conventional schooling and practices more characteristic of an ecopolitical worldview. This model does not suggest that either we or our learners should turn our backs on what Emery calls "the storehouses of [theoretic] knowledge" but it does require us to be discriminating in making judgements about what we consider to be important in these storehouses. For example, the conceptual understandings which Earth Education seeks to develop were restricted initially to seven "big ideas" in ecology - and these have since been reduced to four. As already noted, this is because Earth Education opts for the big picture in understanding life:

> The minutiae of life's workings are not of foremost importance for us; our goal is not pulling apart the insides of a frog, but understanding the frog inside the pond and the pond inside the water cycle... This does not mean that... we think the "small picture" of life is unimportant, but only that such study should be self-motivated and should follow the individual's grasp of the big picture (Van Matre, 1979: 8)

In some Earth Education activities these "big ideas" are used figuratively as "keys" to the storehouse of socially constructed knowledge that we call "ecology" and, after some initial practice in their use, learners are encouraged to use the keys in a self-motivated way. These key concepts are given further meaning by their use as tools for sustaining learners' perceptual work in natural environments. For example, in the environs of an Earth Education campsite, it would be most unlikely to find trees or shrubs labelled with botanical names or any other specific information about them. It would be

more likely for one to find a piece of plumbers' pipe bearing the word "cycles" lashed to a tree; when curious observers look through the pipe, they could find themselves attending to what might otherwise have been a rather unobtrusive fungus decomposing a fallen branch. It is also most likely that the pipe would have been placed there by a child rather than an Earth Education leader.

I have used the Earth Education model to design learning activities in a variety of graduate and undergraduate teacher education programs in curriculum study. My experience satisfies me that strategies based on the model are effective in developing learners' perceptual skills and conceptual understandings regardless of the environments being searched. The strategies are as effective at developing perceptual discriminations in social environments, such as perceiving subtleties in the institutional arrangements through which schools assess student achievement, as they are in developing sensory awareness of biological diversity in natural environments.

Conclusion

In encouraging teachers to "become ecopolitical", I have found Garth Boomer's notion of teaching as a kind of "bushcraft" to be a useful and appropriate metaphor:

> In the ecology of the school "bush" there is a bewildering array of texts, tests, assignments and artefacts. The teacher should be used to finding interesting and pertinent specimens and talking about their characteristics, habits and habitats. Students should be encouraged to familiarise themselves with funny creatures like science textbooks, learning how to tame them, remembering where dangers lurk... Teachers should not drive students in a tourist bus through the school curriculum, encouraging the bland recital of tourist blurbs. Students should be obliged to savour the texture of life, wild and rich (Boomer, 1982: 119)

I would add that educational "bushcraft" in socially constructed environments needs to be a form of **praxis** rather than mere "craft" and, like the more familiar kinds of "bushcraft", it is most likely to be learned from personal experience and by apprenticeship to someone who models it, such as a teacher who communicates his/her perceptual discriminations and conceptual understandings with genuine enthusiasm and flair. Part of the significance of "becoming ecopolitical" in education may be that it provides practitioners with some of the moral convictions that make such enthusiasms credible - and, I hope, contagious.

Notes

1. The position argued in this paper is developed in greater detail in Gough (in press).

2. I have little enthusiasm for any "quest" for a "new" educational paradigm. In part, this lack of enthusiasm reflects my antipathy towards the quasi-religious zealotry of such a quest. "The new paradigm story is a postmodern version of ancient millennarian cults that predicted the imminent coming of a new order, a paradise on Earth" (Michael and Anderson, 1986: 119). I cannot reconcile much of the rhetoric of new paradigm thinking with the kind of curriculum work that I want to do now and in future (I suppose that I am suspicious of the quality of life after quests: what does one actually **do** after one has **found** the Holy Grail?).

3. This account of ecological theories of perception is based on Emery's (1981) very useful synthesis of recent research in perceptual psychology and its educational implications.

4. Heider's papers were written in Berlin during the late 1920s but were not translated into English until 1959, by which time his research had been parallelled by J.J.Gibson.

5. The "longer term... perspective" to which I refer also has a future dimension, though it is beyond the scope of this paper to explore it. The conceptual territory of futures in education is explored in considerable detail by Slaughter (1988). The implications of futures study for curriculum inquiry and curriculum design are outlined in Gough (1987a, 1988a, 1989).

6. Awareness of one's thinking and control of it has recently come to be called "metacognition" by a number of researchers who have studied children's "cognitive strategies" (see, for example, Baird, 1986; Brown, 1980). However, if thinking is more a matter of perception than cognition, then "metaperception" might be a more appropriate term.

7. This account of an Earth Education activity records my own observations, but its narrative form borrows heavily from Hoessle and Van Matre, 1980.

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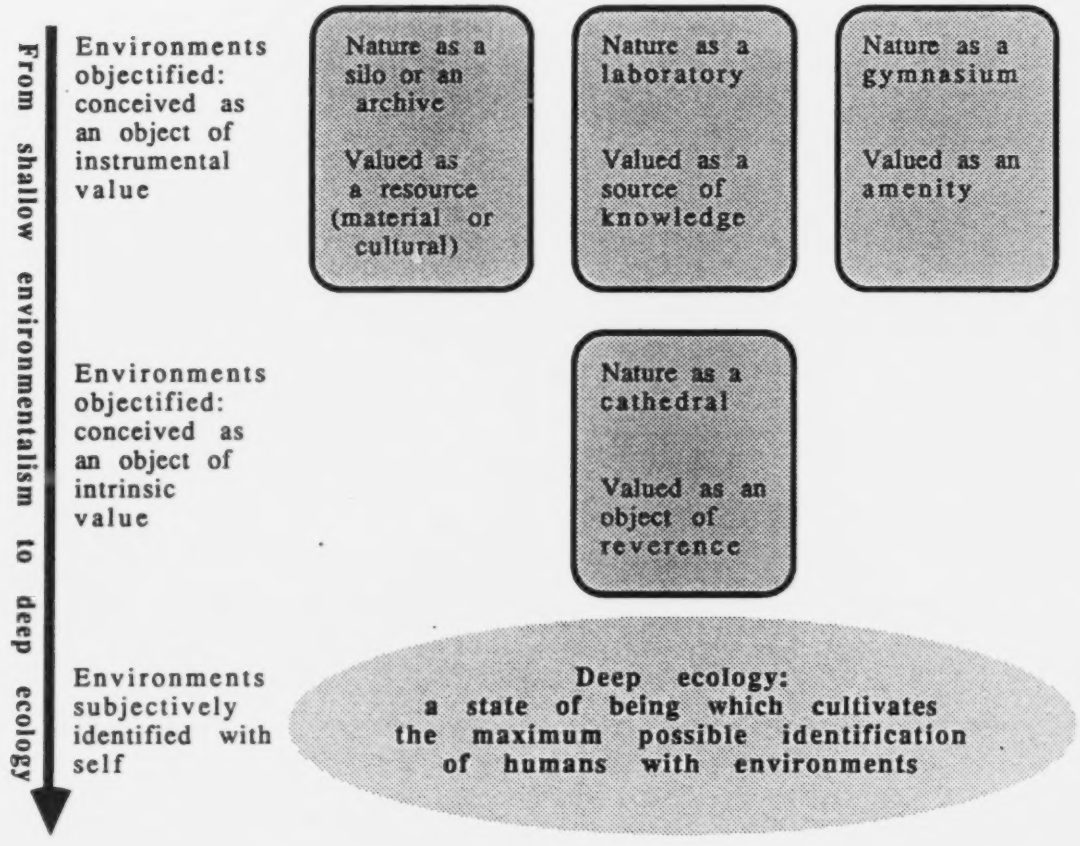
Appendix

Figure 1: From shallow environmentalism to deep ecology


From shallow environmentalism to deep ecology
Environments objectified: conceived as an object of instrumental value
Nature as a silo or an archive
Valued as a resource (material or cultural)
Nature as a laboratory
Valued as a source of knowledge
Nature as a gymnasium
Valued as an amenity
Environments objectified: conceived as an object of intrinsic value
Nature as a cathedral
Valued as an object of reverence
Environments subjectively identified with self
Deep ecology:
a state of being which cultivates the maximum possible identification of humans with environments